required, and no axioms or postulates except Euclid's may be assumed. The actual proofs of propositions as given in Euclid will not be required, but no proof of any proposition occurring in Euclid will be admitted in which use is made of any proposition which in Euclid's order occurs subsequently."

The subject came on for discussion in the School on January 26, 1888, and a grace finally passed the Senate (March 8, 1888), making the alteration in the regulations for the previous examination recommended in the Report.

The Council of the Association then forwarded an Address to Her Majesty's Civil Service Commissioners, drawing their attention to the recent Reports of the University Boards, and asking for corresponding alterations in the regulations for the Woolwich and Sandhurst examinations, as follows:

"In view of the above facts, the Council feel themselves justified in inviting the attention of Her Majesty's Civil Service Commissioners to the desirability of a change in one of the existing regulations for the examinations conducted under their authority, especially those for admission to Sandhurst and Woolwich. By this a candidate is required to 'satisfy the Commissioners in Euclid, Books I.-IV. and VI.' The Council, having reason to believe that this regulation is very generally understood to imply that Euclid's text is required without any but mere verbal variations, beg to suggest that the subject should be defined as 'Elementary Geometry to the extent of Books I.-IV. and VI. of Euclid's "Elements,"' with a note to the effect that 'any proofs will be admitted which are themselves sound, do not assume other axioms than those of Euclid, and are not inconsistent with the logical sequence of Euclid's theorems.'

"The Council would prefer to have no particular text-book prescribed, and to have the candidate's general knowledge of geometry tested, rather than his power of reproducing Euclid's text.

"While making this request, however, the Council wishes to express its acknowledgment of the high character of the papers in Euclid set by the Civil Service Examiners, and particularly of the frequent introduction of stimulative exercises on the book work set.

"The Council would esteem it a favour if they were allowed to express their views on this important question more at large by a deputation from their body at an interview with the Commissioners."

The following reply was received from the Commissioners:—

"*Civil Service Commission, June* 30, 1888.

"Sir,—I am directed by the Civil Service Commissioners to acknowledge the receipt of a circular signed by you in behalf of the Council of the Association for the Improvement of Geometrical Teaching, requesting that certain changes may be introduced into the regulations for the examinations held under their authority, and in particular those for admission to Sandhurst and Woolwich;

"And, in reply, I am to acquaint you, for the information of the Council, that the regulations for the military examinations are framed and issued by the military authorities, and that the Commissioners have no power to alter them, but that the interpretation which the Commissioners have given them has been substantially in accordance with the views expressed by the Cambridge Special Board for Mathematics and the Oxford Board of the Faculty of Natural Science. They have, that is to say, instructed their occasional examiners to make no deduction from the marks allotted to a question because a candidate substitutes another proof for Euclid's, if this proof is a sound one and keeps to Euclid's sequence of propositions. To remove any misconception which may exist, the Commissioners propose to introduce a note to this effect in the examination papers. It will be understood, however, that they do not intend thereby to fetter their discretion of changing their practice whenever they may consider it expedient.

"In conclusion, while thanking the Council for their offer to express their views on this question more at large by the medium of a deputation from their body, the Commissioners think that the agreement of their opinion on this matter renders it unnecessary that the members of the Council should give themselves the trouble of an interview.

"I have the honour to be, Sir,
"Your obedient servant,
"E. POSTE."

Doubtless these concessions are in form the sorriest minimum of change that could well be granted; but the spirit of the Reports is excellent, particularly if examiners allow themselves, as it is quite open for them to do, to interpret "Euclid's order" as his *logical* and not merely his *numerical* order. Probably, if there is a strong desire for further relaxation generally felt and expressed by teachers, there will be no great difficulty in getting it granted; but it is by no means clear that such a desire exists at present to a sufficient degree to bring pressure to bear on the authorities. One does not easily see why the sequence of the Syllabus and the "Elements" should not have been granted as an alternative to that of Euclid, as is done by the University of Edinburgh. These works are the outcome of considerable discussion and deliberation by practised teachers, and it seems scarcely right to ignore them so entirely. As far as Cambridge is concerned, there is one detail of reform which might be effected without going beyond the terms of the grace of the Senate; *i.e.* the authorization of a list of additional propositions not contained in Euclid's text, to be freely used in the demonstration of all propositions subsequent to the position they may be regarded as occupying in Euclid's sequence. Such a list need not be long, and its adoption would be a boon to those teachers who wish to use the Syllabus.

ELECTROSTATIC MEASUREMENT.[1]

THE number of electrostatic units of potential or electromotive force in the electro-magnetic unit of potential is essentially a velocity, and experiments have proved it to be so nearly equal to the velocity of light that from all the direct observations hitherto made we cannot tell whether it is a little greater than, or a little less than, or absolutely equal to, the velocity of light.

Sir W. Thomson is engaged now in making a set of electrometers which will measure by electrostatic force potentials of from 40 volts to 50,000 volts. The standardization of these instruments up to 200 or 300 volts is made exceedingly easy, by aid of his centiampere balance and continuous rheostat, with a voltaic battery of any kind, primary or secondary, capable of giving a fairly steady current of $\frac{1}{10}$ of an ampere through it and the platinoid resistance in series with it. The accuracy of the electro-magnetic standardization, within the range of the direct application of this method, is quite within $\frac{1}{20}$ per cent. A method of multiplication by aid of condensers, which was explained, gives an accuracy quite within $^1/_5$ per cent. for the measurement in volts up to 2000 or 3000 volts; and with not much less accuracy, by aid of an intermediate electrometer, up to 10,000 volts. Such a potential as 10,000 volts is convenient for measurement by an absolute electrostatic balance, which was fully explained in the lecture, and illustrated by a drawing. But hitherto he has not been able to make sure of the absolute accuracy of the electrostatic balance to closer than $^1/_2$ per cent. The results of a great number of measurements made in the Physical Laboratory of the University of Glasgow during the last

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[1] Abstract of part of Sir William Thomson's Royal Institution Lecture of Friday evening, February 8, relating to the velocity of light.

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two months, give the required number, commonly called “v,” within $^1/_2$ per cent. of 300,000 kilometres per second; the velocity of light is known to be within $^1/_4$ per cent. of 300,000 kilometres per second. Results of previous observers for determining “v” had almost absolutely proved at least as close an agreement with the 300,000,000 metres as this. He expressed his obligations to his assistants and students in the Physical Laboratory of Glasgow University, Messrs. Meikle, Shields, Sutherland, and Carver, who worked with the greatest perseverance and accuracy, in the laborious and often irksome observations by which he had attempted to determine “v” by the direct electrometer method, as exactly as, or more exactly than, it has been determined by other observers and other methods.

The measurement of “v” by Sir William Thomson and Profs. Ayrton and Perry, communicated to the British Association at Bath, was too small (292) on account of the accidental omission of a correction regarding the effective area of the attracted disk in the absolute electrometer. When this correction is applied their result is brought up to 298, which exactly agrees with Profs. Ayrton and Perry's previous determination by another method, in Japan. Prof. J. J. Thomson's result is 296·3. It is understood that Rowland has found 299. The result of Sir William Thomson's latest observations, founded wholly on the comparison of electrometric and electro-magnetic determinations of potential in absolute measure, is 30·1 legal ohms, or 30·04 Rayleigh ohms. Assuming, as is now highly probable, that the Rayleigh ohm is considerably nearer than the legal ohm to the true ohm, the result for “v” is 300,400,000 metres per second. Sir William does not consider that this result can be trusted as demonstrating the truth within $^1/_3$ per cent.

NOTES.

The Royal Society's Bakerian Lecture for the present year is to be “On a Magnetic Survey of the British Isles for the epoch January 1, 1886,” by Prof. A. W. Rücker, F.R.S., and Prof. T. E. Thorpe, F.R.S.

Captain W. J. L. Wharton, R.N., F.R.S., Hydrographer to the Admiralty, has been elected a member of the Athenæum Club, in accordance with the rule which empowers the Committee to elect annually a certain number of persons of distinguished eminence in literature, science, or art, or for public services.

The American Association for the Advancement of Science will meet this year at Toronto from August 27 to September 3. It is expected that the attendance will rival that at the Boston meeting of 1880. The President of the Association is Prof. Mendenhall. Major Powell, as retiring President, gives the address.

The French Association for the Advancement of Science will meet at Paris from August 8 to 15.

The French Ministry of Public Instruction has decided to create a laboratory of pathological physiology at the École des Hautes Études, Paris. The Director will be M. François-Franck, assistant of M. Marey at the Collège de France.

Dr. Selmar Schönland, of the Botanic Garden, Oxford, has been appointed to the Curatorship of the Albany Museum, Grahamstown, Cape Colony.

In the spring, M. Hasselberg will go from Pulkowa to Stockholm, having been elected Fellow of the Royal Academy of Sciences, and Director of the Physical Institution of the Academy, in succession to Prof. Edlund.

The Bombay Anthropological Society has resolved to communicate with the executors of Mr. E. T. Leith, the founder of the Society, with a view to secure the publication of his literary remains under the supervision and at the expense of the Society.

Further experiments are to be carried out shortly at Chatham by the Balloon Department with the Bruce system of electric balloon signalling. The apparatus used will be that which the Government purchased of the inventor, Mr. Eric Stuart Bruce.

We regret to hear of the death of Captain John Ericsson, the famous Swedish engineer. He died the other day at New York, at the age of eighty-six. Captain Ericsson was a man of extraordinary intellectual resource, and his name stands high among the great inventors of the present century. An effective screw-propeller was invented independently both by him and by Francis Pettit Smith. Smith's patent was taken out in May 1836, a little before Ericsson's; but the date of Ericsson's invention was considerably earlier than that of his English rival. The screw-propeller of Ericsson was at once adopted by the United States Navy, but in England he had the mortification of being officially informed that it was useless, because, “the power being applied at the stern, it would be absolutely impossible to make the vessel steer.” Afterwards he had occasion to learn that an inventor's difficulties may be not less formidable in the New World than in the Old, for he was badly treated in connection with the *Princeton* screw steamer, designed by him for the United States Government in 1844, and in connection with the *Monitor*, which he built during the Civil War. During his last years he was much occupied with what he called “the sun motor,” an article on which, by himself, recently appeared in Nature (vol. xxxviii. p. 319).

Dr. John Call Dalton, the physiologist, died at New York on February 12, at the age of sixty-four.

After the ordinary meeting of the Royal Meteorological Society, at 25 Great George Street, Westminster, on Wednesday, the 20th inst., the Fellows and their friends will inspect the Society's tenth annual Exhibition of Instruments. The Exhibition will remain open until Friday, the 22nd inst. It promises to be very interesting and instructive. It will be specially devoted to actinometers and solar radiation apparatus, but will also include several new instruments, and a number of photographs of flashes of lightning, clouds, &c. Persons, not Fellows, wishing to visit the Exhibition, can obtain tickets on application to Mr. W. Marriott, Royal Meteorological Society, 30 Great George Street, S.W.

We have received, from the Meteorological Reporter to the Government of India, the “Registers of Original Observations” made at seven selected observatories during the months of January to July 1888. These observations, although not exactly in the form prescribed, are published in pursuance of a decision of the Meteorological Congress held at Vienna in 1873, that each country should publish daily observations for a certain number of stations. The Indian observations have been published in this monthly form since January 1879, while for the years 1875-78 they formed an appendix to the Annual Reports. They contain complete information of all the principal elements for four hours daily, together with daily means, and monthly means for each of the four hours. The registers also contain means of the chief elements for each hour of the day at Alipore (Calcutta), and the hourly movement of the wind at Lucknow and Nagpur. The more rapid dissemination of the information by the publication of monthly parts, instead of annual volumes, renders it more valuable to persons interested in meteorological investigations.

M. Klossovski, who published some time ago an important work on the thunderstorms of Russia, has now made another valuable contribution to the meteorology of South

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